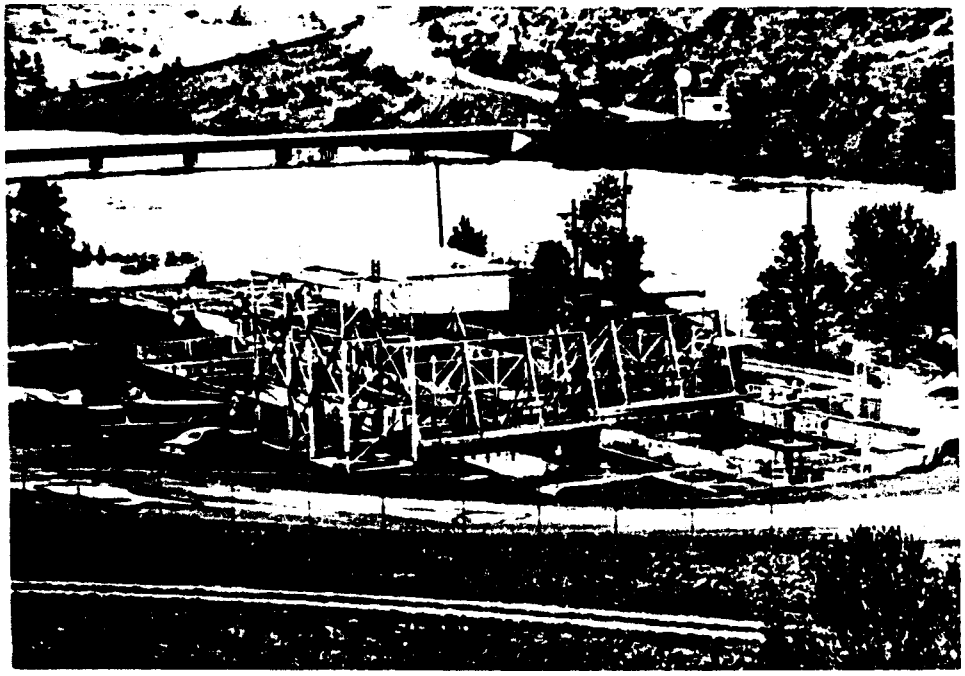
OXBOW FISH HATCHERY AND HELLS CANYON FISH TRAP

1988 Annual Report



by

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ABSTRACT

Adult steelhead returning to the Hells Canyon Dam trapping facility for the 1988 brood year was 2,524 (1,303 in the Fall 1988 and 1,221 in the Spring of 1989). Total prespawning mortality was 110 fish (7.5%). A total of 4,939,441 green eggs were taken from 1,065 females for an average of 4,638 eggs per female. Eye-up produced 3,853,757 eyed eggs for a survival rate of 78.0%. A total of 1,213,400 eyed eggs were transferred to Niagara Springs Hatchery. There were 702,000 swim-up fry planted.

Spring chinook salmon trapping resulted in 458 adults and 13 jacks being trapped (471 salmon). A total of 393 chinook (381 adults and 12 jacks) were transferred to Rapid River Fish Hatchery for spawning.

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OXBOW HATCHERY AND HELLS CANYON FISH TRAP

1988 ANNUAL REPORT

Hatchery and Trap Description

Oxbow Fish Hatchery is part of the Idaho Power Company's (IPC) hatchery system and has been operated since 1962. The Oxbow facility is owned and funded by the Idaho Power Company and operated by the Idaho Department of Fish and Game (IDFG). The primary purpose is to trap sufficient number of returning steelhead and spring chinook to fulfill the Hells Canyon portion of IPC's anadromous fish mitigation requirements. Mitigation goals are to produce 1.3 million eyed steelhead eggs to be shipped to Niagara Springs Fish Hatchery and to ship all adult spring chinook trapped to Rapid River Fish Hatchery.

Oxbow receives its water from the Snake River (Hells Canyon Reservoir) on the Oregon side, approximately 1/4-mile downstream from the IPC's Oxbow Hydroelectric Plant. Two production pumps (100 hp each) produce 20 cfs of water and two incubation pumps (10 hp each) produce another 0.5 cfs of water. Water temperatures range from a winter low of 33°F to a late summer high of 75°F (Figure 1). Water from the production pumps is distributed into four concrete holding ponds and six cinderblock raceways. Incubation water enters the hatchery building through a 6-inch water pipe.

Adult holding and production facilities include: four holding ponds equipped with two electric crowding racks, two ponds measuring 105 ft x 30 ft x 5 ft provide 31,500 cubic feet of holding area, and two ponds measuring 55 ft x 30 ft x 5 ft provide an added 16,500 cubic feet of holding area; four rearing vats each with 30 cubic feet of rearing space; six raceways each with 1,700 cubic feet of rearing space; and fourteen double stacks of Heath Techna/FAL incubators containing 224 trays. The adult trapping facility consists of an attraction pool, a fish ladder, two weirs, a fish trap, and a jib-crane hoisted fish-loading hopper. Fish are transported in a tank truck the 23 miles upstream to the Oxbow Hatchery.

Steelhead Trapping and Holding

The Hells Canyon ladder and trap operated a total of 177 hours between November 2 and December 18, 1987 trapping 1,303 steelhead. Trap operations were resumed on March 1 and ran a total of 742 hours trapping an additional 1,221 adults by April 18, 1988. Adult steelhead totaling 2,524 (1,442 female; 1,082 male) were trapped in 919 hours, or approximately 2.75 fish per hour of trap operation (Figure 2). All fish were brought to the Oxbow Hatchery where they were recorded by individual sex and fork length to the nearest centimeter (Figure 3). These fish consisted of 1,614 one-ocean A's and 910 two-ocean A's. Steelhead year class criteria is: One-ocean - males less than 68 cm, females 65 cm and less; Two-ocean - males 68 cm or larger, females 65 cm or larger. All fish were held at Oxbow Fish Hatchery.

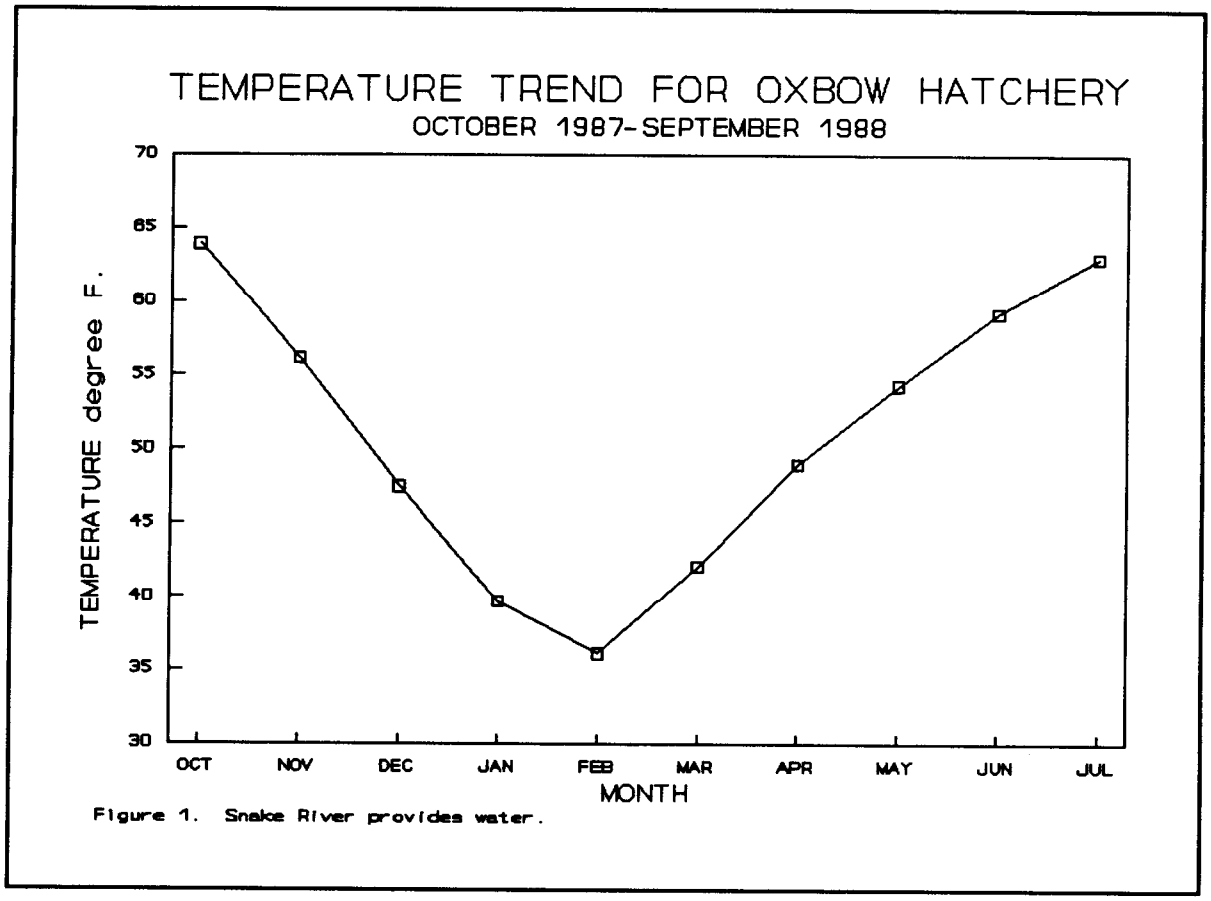


Figure 1. Snake River provides water.

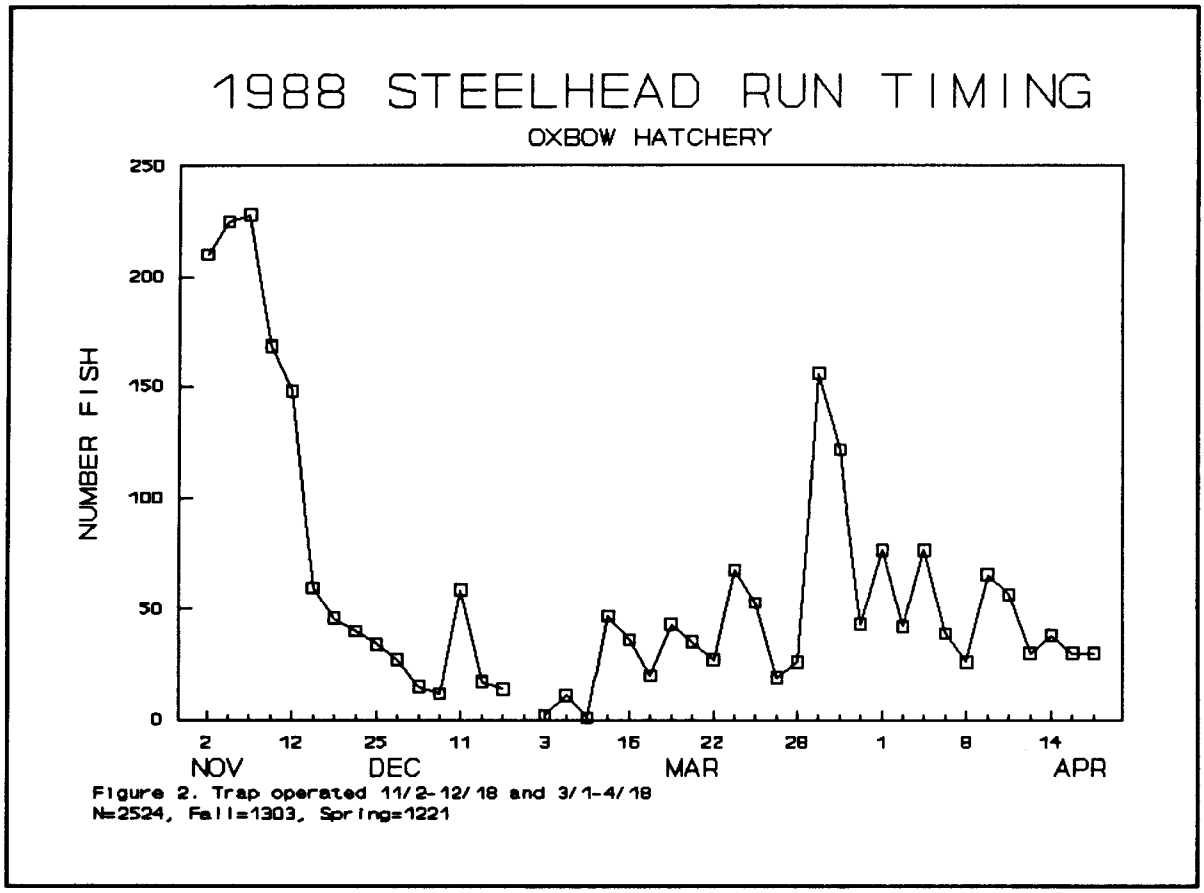


Figure 2. Trap operated 11/2-12/18 and 3/1-4/18
N=2524, Fall=1303, Spring=1221

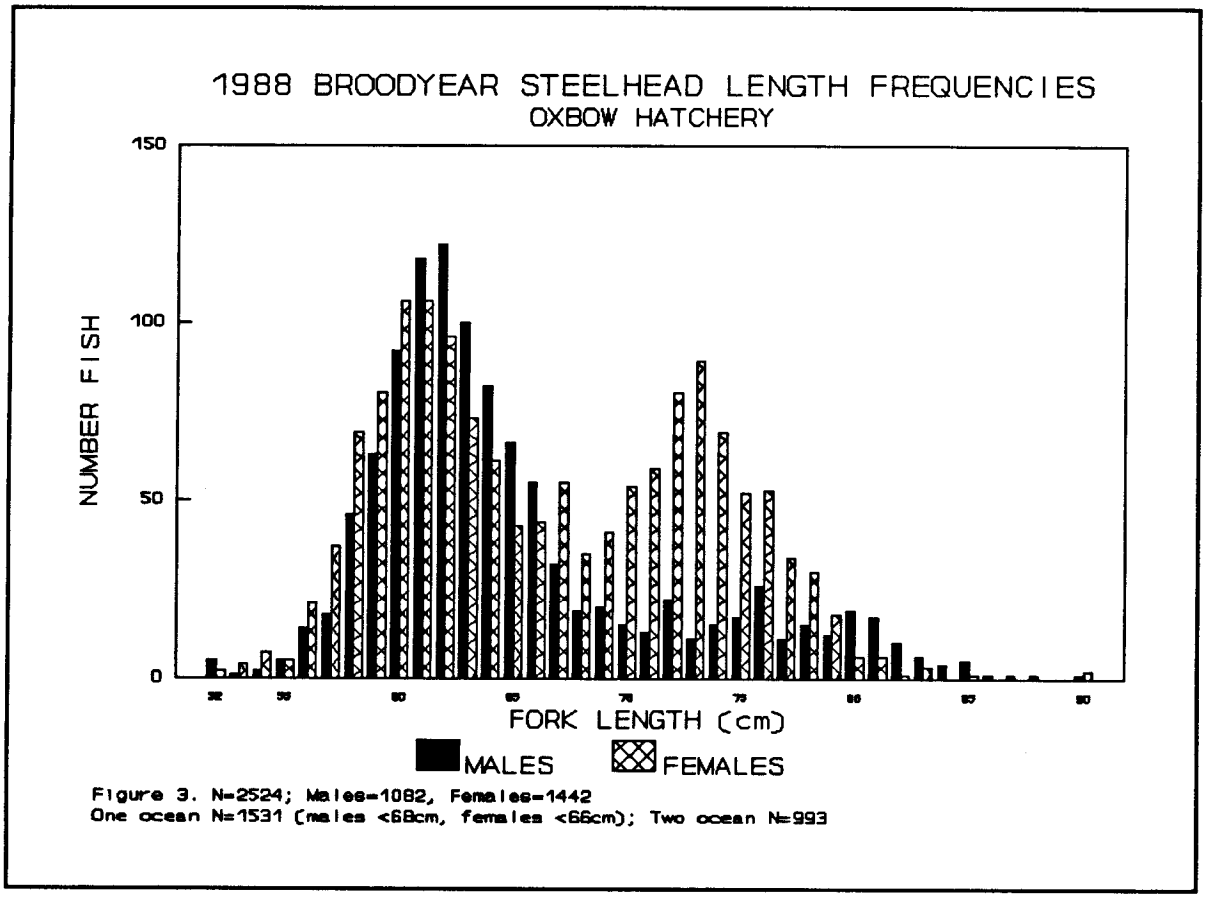


Figure 3. N=2524; Males=1082, Females=1442
One ocean N=1531 (males <68cm, females <66cm); Two ocean N=993

Adult Steelhead Tact Recovery.

Adult steelhead were examined for fin clips, jaw tags, floy (spaghetti) tags and freeze brands. Of the 2524 fish trapped, 59 (2.3%) had left ventral (LV) fin clips indicating coded wire tags, 7 (0.3%) had National Marine Fisheries Service jaw tags, 4 (0.1%) had Oregon Department Fish and Wildlife floy tags, and 2 (0.07%) were freeze branded with an inverted "P" on the left side anterior to the dorsal fin. The snouts were removed from the adults with LV fin clips and shipped to the tag recovery laboratory in Lewiston.

Adult fish were also examined to determine "natural" from hatchery fish. The condition of all fins was used to determine the difference, with wild fish having perfect or nearly perfect fins, while fish with missing or deformed fins being considered as hatchery fish. There were 108 natural steelhead trapped (4.3%); 56 in the fall of 1987 and 52 in the spring of 1988.

Fish Health

Various disease samples were collected from 60 spawning steelhead adults on April 5, 1988. Positive results were found of infectious pancreatic necrosis virus (IPNV), infectious hematopoietic necrosis virus (IHNV), Renibacterium salmoninarium (BKD), and Ceratomyxa shasta (Table 1).

Table 1. Results of fish disease samples of 60 adult steelhead at Oxbow Hatchery on April 5, 1988.

TEST	SAMPLE	RESULT
Virology	ovarian pools	9/12 IHNV+
Virology	tissue pools	6/12 IHNV+
Virology	tissue pools	1/12 IPNV+
Virology	blood smears	0/60 EIBS
Bacteriology	FAT smears	9/22 BKD+
Bacteriology	FAT smears	28/60 BKD+
Parasitology	gut smears	2/18 C.shasta

Prespawning Mortality.

Prespawning mortality included all females which died before spawning and males that died through the second week of spawning. Total prespawning mortality was 110 fish (7.5%). Sixty-eight mortalities had external fungus infection, and 51 mortalities had hemorrhage in the intestinal tract or other internal organs. There were no fish lost due to transportation or trapping.

Steelhead Spawning

Spawning operations began on March 21 and continued through April 21, 1988. A total of 1,065 females were spawned for a green egg take of 4,939,441 (4,638 eggs per female) (Table 2).

Table 2. Summary of steelhead spawning at Oxbow Hatchery, 1988.

SPAWNING DATE	FEMALES SPAWNED	GREEN EGGS	EYED EGGS	PERCENT EYE-UP
3/21	47	202,554	143,248	70.7
3/28	84	372,269	289,916	77.9
3/29	93	472,771	378,877	80.2
4/1	119	584,569	473,771*	81.0
4/4	104	517,442	397,907*	76.9
4/5	87	359,293	303,181*	84.4
4/7	70	290,597	229,254	78.9
4/8	42	217,756	170,560	78.3
4/12	123	576,621	480,125*	83.3
4/15	171	765,403	583,296	76.2
4/20	56	253,167	192,319	76.0
4/21	69	327,393	211,303*	64.5
TOTALS	1,065	4,939,441	3,853,757	78.0

*Lots shipped in part or entirety to Niagara Springs Hatchery.

Females were spawned using the incision method. Eggs were collected in a colander to drain the ovarian fluid. Eggs from two females were placed into a spawning bucket and fertilized with sperm from two or three males. The fertilized eggs were allowed to stand in two cups of well water for two to five minutes, rinsed once with well water, then water-hardened in 100 ppm buffered Argentyne for one hour.

Steelhead Eggs

Eggs from each spawning bucket were placed into the incubators (two females per bucket), or approximately 8,000 eggs (1,000 mis) per tray. Each stack received 4.8 to 5.0 gpm of incubation water. Incubation water ranged from a low of 47°F to a high of 61°F. After 72 hours of incubation, green eggs were treated with formalin at a rate of 1,667 ppm in a 15-minute drip. Treatments were on an every-other-day basis until water temperatures reached 55°F when treatments were administered five days a week.

Eyed eggs were shocked before sorting with a Jensorter egg picker and counter borrowed from McCall Hatchery. Niagara Springs Hatchery received 1,213,400 eyed eggs. The remaining eyed eggs were incubated to swim-up fry for planting. We planted 702,000 swim-up fry. The remaining 1,938,357 fry either perished during incubation or escaped from the outside raceways (Table 3).

Table 3. Summary of steelhead fry outplants from Oxbow Hatchery, June 1988.

DATE	NUMBER FRY	NUMBER POUNDS	FISH/POUND	RECEIVING WATER
6/2	378,500	122	3,109	L. Salmon River
6/3	231,700	166	3,131	Boulder Creek
6/23	91,800	31	2,939	Hazard Creek
TOTAL	702,000	319	3,060	

Smolt Releases

Steelhead smolt releases were conducted in the fall of 1987 and the spring of 1988. These releases were from the 1987 brood year reared at Niagara Springs Hatchery. There were 404,000 presmolts release in the fall, while 877,400 smolts were released in the spring. All releases were below Hells Canyon Dam into the Snake River.

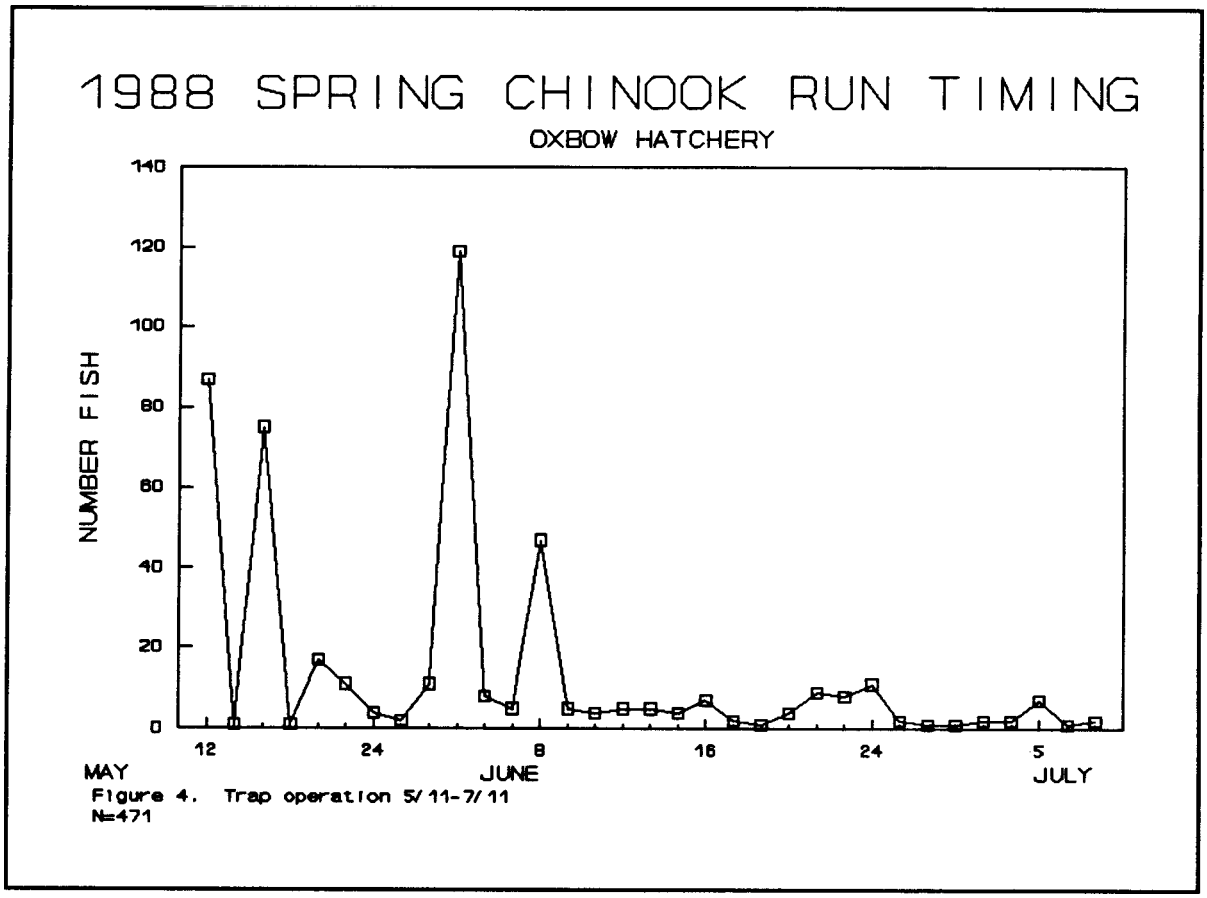
Carcass Disposition

All carcasses were checked for symptomatic signs of bacteria and other diseases. Snouts were removed from marked fish, and all carcasses were then taken to the landfill for disposal.

1988 SPRING CHINOOK SALMON

Spring Chinook Salmon Trapping

Adults returning to the Hells Canyon Trap in 1988 were from chinook salmon smolt releases in 1985, 1986, and 1987 (Table 4). Spring chinook trapping began on May 11 and ended July 10, 1988 capturing 471 chinook salmon (Figure 4). The run was composed of 458 adults and 13 jacks. Fork length frequencies to the nearest centimeter were used to determine the year class (Figure 5). Less than 52 cm salmon are one-ocean, 53 cm to 80 cm are two-ocean, and salmon over 80 cm are three-ocean (Table 5). The 78 mortalities included 77 adults and 1 jack. These mortalities include 72 hauling mortalities and 6 pond mortalities.


1988 SPRING CHINOOK RUN TIMING
OXBOW HATCHERY
NUMBER FISH
140
120
100
80
60
40
20
0
12
24
8
16
24
5
MAY
JUNE
JULY
Figure 4. Trap operation 5/11-7/11
N=471

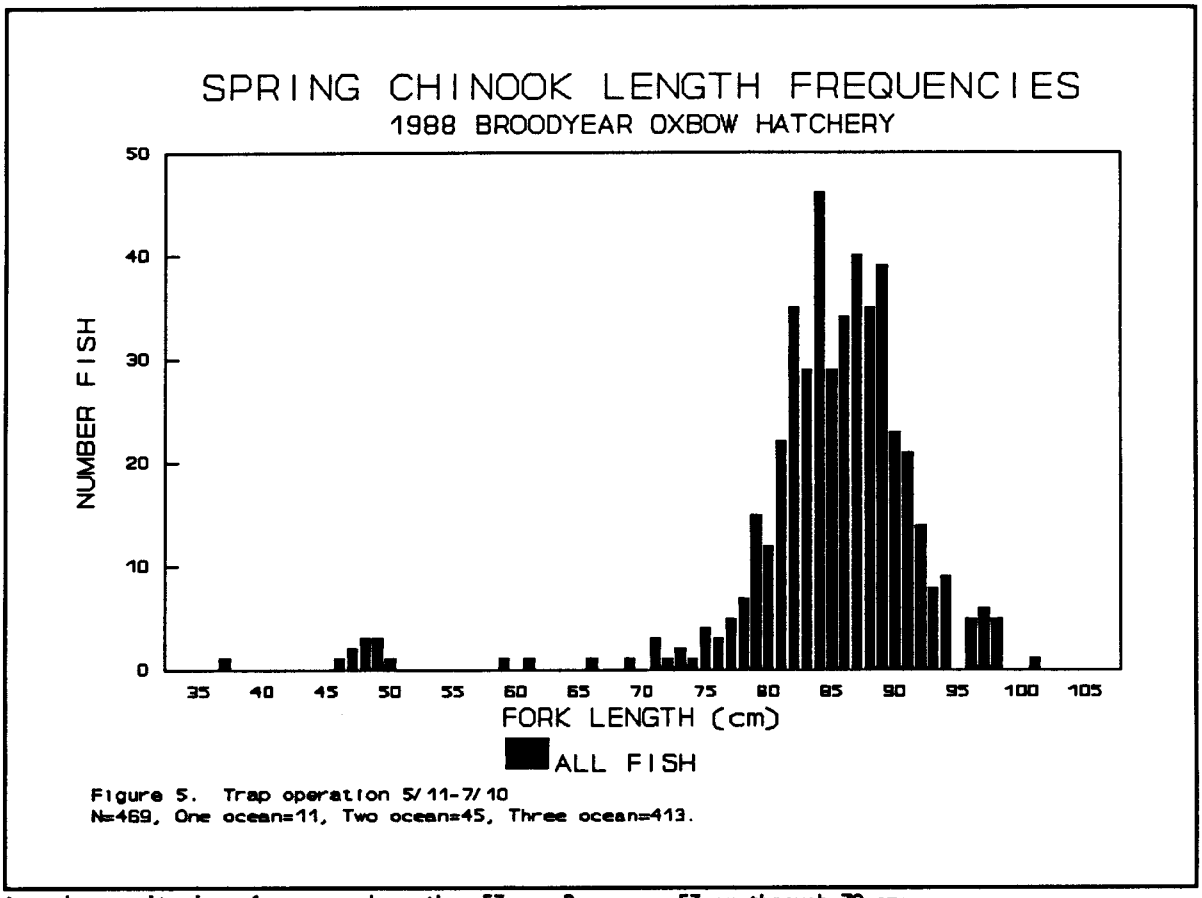


Figure 5. Trap operation 5/11-7/10
N=469, One ocean=11, Two ocean=45, Three ocean=413.

Age class criteria: 1-ocean - less than 53 cm; 2-ocean - 53 cm through 79 cm; 3-ocean - 80 cm and larger

Table 4. Spring chinook salmon smolt releases below Hells Canyon Dam for 1985, 1986, and 1987.

RELEASE YEAR	NUMBER SMOLTS
1985	437,360
1986	140,000
1987	103,000
TOTAL	670,360

All of the salmon trucked to Oxbow Hatchery were anesthetized, measured for fork length, injected with erythromycin phosphate, and checked for tags and any other marks or wounds. There were no adipose-clipped fish, 1 (1.2%) jaw-tagged fish, 50 (59.5%) with gill net scars, 8 (9.6%) with nitrogen gas emboli, and 24 (27.6%) had other wounds or scars of uncertain origin. Two adult chinook were released below Hells Canyon Dam the last day of trapping.

Spring Chinook Transport

Four trips from Oxbow to Rapid River Hatchery were made to transport the fish. Water temperatures were reduced in the transport truck with the use of 800 to 900 pounds of block ice per trip. There were 381 adults and 12 jacks (393 total) shipped to Rapid River Hatchery.

Smolt Releases

Chinook smolt releases in 1988 were conducted in the spring. These releases were from the 1986 brood year taken at Rapid River Hatchery. A total of 551,200 (18,373 pounds) spring chinook smolts were released into the Snake River below Hells Canyon Dam.

Table 5. Year class of spring chinook salmon trapped at Oxbow Hatchery for 1988.

YEAR CLASS	NUMBER FISH
ONE OCEAN	11
TWO OCEAN	45
THREE OCEAN	413
TOTAL	469

Year class criteria:

1-ocean – less than 52 cm
2-ocean – 53 cm through 79 cm
3-ocean – 80 cm and larger

A P P E N D I C E S

Appendix A. Temperature trend for Oxbow Hatchery from October 1987 through September 1988.

Month	Average Temperature
OCT	63.9
NOV	56.2
DEC	47.5
JAN	39.7
FEB	36.1
MAR	42.1
APR	49
MAY	54.3
JUN	59.2
JUL	63
AUG	70.8
SEP	69.1

Appendix B. Run timing of steelhead trout to Oxbow Hatchery for the 1988 brood year.

Month	Date	Number
NOV	2	210
	3	225
	5	228
	10	168
	12	148
	17	60
	19	46
	23	40
	25	34
	30	27
DEC	4	15
	8	12
	11	59
	15	17
	18	14
MAR	3	2
	9	11
	11	1
	15	47
	16	36
	17	20
	18	43
	21	35
	22	27
	23	68
	24	53
	25	19
	28	26
	29	156
	30	122
	31	43
APRIL	1	77
	5	42
	6	77
	7	39
	8	26
	11	66
	12	57
	13	30
	14	38
	15	30
	18	30
TOTAL		2,524

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Appendix C. Fork length (cm) frequencies for steelhead trapped at Hells Canyon Dam, 1987-88.

Length	Male	Female
52	5	2
53	1	4
54	2	7
55	5	5
56	14	21
57	18	37
58	46	69
59	63	80
60	92	106
61	118	106
62	122	96
63	100	73
64	82	61
65	66	43
66	55	44
67	32	55
68	19	35
69	20	41
70	15	54
71	13	59
72	22	80
73	11	89
74	15	69
75	17	52
76	26	53
77	11	34
78	15	30
79	12	18
80	19	6
81	17	6
82	10	1
83	6	3
84	4	0
85	5	1
86	1	0
87	1	0
88	1	0
89	0	0
90	1	2
TOTAL	1,082	1,442

	Males	Females	Mean Length
ONE OCEAN	821	710	61.29
TWO OCEAN	261	993	73.20
TOTAL	1,082	1,442	65.98

Appendix D. Run timing of 1988 spring chinook salmon to Hells Canyon fish trap.

Month	Date	Number Trapped
MAY	12	87
	12	1
	18	75
	19	1
	20	17
	22	11
	24	4
	25	2
	26	11
	31	119
JUNE	1	8
	2	5
	8	47
	9	5
	10	4
	12	5
	13	5
	15	4
	16	7
	17	2
	18	1
	20	4
	21	9
	23	8
	24	11
	25	2
	27	1
	28	1
	29	2
	30	2
JULY	5	7
	6	1
	11	2
TOTAL		471

Appendix E. Fork length (cm) frequencies for spring chinook salmon trapped at Hells Canyon Dam, 1988.

Fork length	Total	Year class	Number	Mean length
		1-OCEAN	11	47.09
46	1	2-OCEAN	45	75.64
47	2	3-OCEAN	413	86.72
48	3	COMBINED	469	84.73
49	3			
50	1			
59	1			
61	1			
66	1			
69	1			
71	3			
72	1			
73	2			
74	1			
75	4			
76	3			
77	5			
78	7			
79	15			
80	12			
81	22			
82	35			
83	29			
84	46			
85	29			
86	34			
87	40			
88	35			
89	39			
90	23			
91	21			
92	14			
93	8			
94	9			
97	6			
98	5			
101	1			
TOTALS 469				

Year class criteria: 1-ocean - less than 53 cm; 2-ocean - 53 cm 79 cm; 3-ocean - 80 cm and larger.

Submitted by:

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